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Even Digital Memories Can Fade

By KATIE HAFNER

The nation's 115 million home computers are brimming over with personal treasures - millions of photographs, music of every genre, college papers, the great American novel and, of course, mountains of e-mail messages.

Yet no one has figured out how to preserve these electronic materials for the next decade, much less for the ages. Like junk e-mail, the problem of digital archiving, which seems straightforward, confounds even the experts.

"To save a digital file for, let's say, a hundred years is going to take a lot of work," said Peter Hite, president of Media Management Services, a consulting firm in Houston. "Whereas to take a traditional photograph and just put it in a shoe box doesn't take any work." Already, half of all photographs are taken by digital cameras, with most of the shots never leaving a personal computer's hard drive.

So dire and complex is the challenge of digital preservation in general that the Library of Congress has spent the last several years forming committees and issuing reports on the state of the nation's preparedness for digital preservation.

Jim Gallagher, director for information technology services at the Library of Congress, said the library, faced with "a deluge of digital information," had embarked on a multiyear, multimillion-dollar project, with an eye toward creating uniform standards for preserving digital material so that it can be read in the future regardless of the hardware or software being used. The assumption is that machines and software formats in use now will become obsolete sooner rather than later.

"It is a global problem for the biggest governments and the biggest corporations all the way down to individuals," said Ken Thibodeau, director for the electronic records archives program at the National Archives and Records Administration.

In the meantime, individual PC owners struggle in private. Desk drawers and den closets are filled with obsolete computers, stacks of Zip disks and 3½-inch diskettes, even the larger 5¼-inch floppy disks from the 1980's. Short of a clear solution, experts recommend that people copy their materials, which were once on vinyl, film and paper, to CD's and other backup formats.

But backup mechanisms can also lose their integrity. Magnetic tape, CD's and hard drives are far from robust. The life span of data on a CD recorded with a CD burner, for instance, could be as little as five years if it is exposed to extremes in humidity or temperature.

And if a CD is scratched, Mr. Hite said, it can become unusable. Unlike, say, faded but readable ink on paper, the instant a digital file becomes corrupted, or starts to degrade, it is indecipherable.

"We're accumulating digital information faster than we can handle, and moving into new platforms faster than we can handle," said Jeffrey Rutenbeck, director for the Media Studies Program at the University of Denver.

Professional archivists and librarians have the resources to duplicate materials in other formats and the expertise to retrieve materials trapped in obsolete computers. But consumers are seldom so well equipped. So they are forced to devise their own stop-gap measures, most of them unwieldy, inconvenient and decidedly low-tech.

Philip Cohen, the communications officer at a nonprofit foundation in San Francisco, is what archivists call a classic "migrator." Since he was in elementary school, Mr. Cohen, 33, has been using a computer for his school work, and nearly all of his correspondence has been in e-mail since college.

Now Mr. Cohen's three home computers are filled with tens of thousands of photos, songs, video clips and correspondence.

Over the years, Mr. Cohen, who moonlights as a computer fix-it man, has continually transferred important files to ever newer computers and storage formats like CD's and DVD's. "I'll just keep moving forward with the stuff I'm sentimental about," he said.

Yet Mr. Cohen said he had noticed that some of his CD's, especially the rewritable variety, are already beginning to degrade. "About a year and a half ago they started to deteriorate, and become unreadable," he said.

And of course, migration works only if the data can be found, and with ever more capacious hard drives, even that can be a problem.

"Some people are saying digital data will disappear not by being destroyed but by being lost," Dr. Rutenbeck said. "It's one thing to find the photo album of your trip to Hawaii 20 years ago. But what if those photos are all sitting in a subdirectory in your computer?"

For some PC users, old machines have become the equivalent of the bin under the bed. This solution, which experts call the museum approach to archiving, means keeping obsolete equipment around the house.

Simon Yates, an analyst at [Forrester Research](#), for example, keeps his old PC in the back of a closet underneath a box. The machine contains everything in his life from the day he married in 1997 to the day he bought his new computer in 2002. If he wanted to retrieve anything from the old PC, Mr. Yates said, it would require a great deal of wiring and rewiring. "I'd have to reconfigure my entire office just to get it to boot up," he said.

Peter Schwartz, chairman of the Global Business Network, which specializes in long-range planning, says that a decade or two from now, the museum approach might be the most feasible answer.

"As long as you keep your data files somewhat readable you'll be able to go to the equivalent of Kinko's where they'll have every ancient computer available," said Mr. Schwartz, whose company has worked with the Library of Congress on its preservation efforts.

"It'll be like Ye Olde Antique Computer Shoppe," Mr. Schwartz said. "There's going to be a whole industry of people who will have shops of old machines, like the original Mac

Plus."

Until that approach becomes commercially viable, though, there is the printout method.

Melanie Ho, 25, a graduate student at the University of California, Los Angeles, has been using computers since elementary school. She creates her own Web sites and she spends much of her day online.

Yet she prints important documents and stores a backup set at her parents' house 100 miles away.

"As much as a lot of people think print will be dead because of computers," she said, "I actually think there's something about the tangibility of paper that feels more comforting."

Proponents of paper archiving grow especially vocal when it comes to preserving photographs. If stored properly, conventional color photographs printed from negatives can last as long as 75 years without fading. Newer photographic papers can last up to 200 years.

There is no such certainty for digital photos saved on a hard drive.

Today's formats are likely to become obsolete and future software "probably will not recognize some aspects of that format," Mr. Thibodeau said. "It may still be a picture, but there might be things in it where, for instance, the colors are different."

The experts at the National Archives, like those at the Library of Congress, are working to develop uniformity among digital computer files to eliminate dependence on specific hardware or software.

One format that has uniformity, Mr. Thibodeau pointed out, is the Web, where it often makes no difference which browser is being used.

Indeed, for many consumers, the Web has become a popular archiving method, especially when it comes to photos. Shutterfly.com and Ofoto .com have hundreds of millions of photographs on their computers. Shutterfly keeps a backup set of each photo sent to the site.

The backups are stored somewhere in California "off the fault line," said David Bagshaw, chief executive of Shutterfly.

But suppose a Web-based business like Shutterfly goes out of business?

Mr. Bagshaw said he preferred to look on the bright side, but offered this bit of comfort: "No matter what the business circumstances, we'll always make people's images available to them."

Constant mobility can be another issue.

Stephen Quinn, who teaches journalism at Ball State University in Muncie, Ind., moves frequently because of his work. He prefers to keep the amount of paper in his life to a minimum, and rarely makes printouts.

Dr. Quinn has a box in the bottom drawer of his desk that contains an eclectic set of storage disks dating back to the early 1980's, when he started out on an Amstrad computer.

All of Dr. Quinn's poetry ("unpublished and unpublishable" he says) and other writings are on those various digital devices, along with his daily diaries.

At some point, he wants to gather the material as a keepsake for his children, but he has no way to read the files he put on the Amstrad disks more than 20 years ago. He has searched unsuccessfully for an Amstrad computer.

"I have a drawer filled with disks and no machinery to read it with," Dr. Quinn said.

That is becoming a basic problem of digital life. Whatever solution people might use, it is sure to be temporary.

"We will always be playing catch up," said Dr. Rutenbeck, who is working at pruning his own digital past, discarding old hard drives and stacks of old Zip disks.

"It feels really good to do," he said, "just like I didn't keep a box of everything I did in first grade."